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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/599,570 | 01/31/2007 | Stephen Peter Hughes | 102881-15 (FF39694/06) | 1933 |

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| EXAMINER | |
|---|---|
| TAKEUCHI, YOSHITOSHI | |
| ART UNIT | PAPER NUMBER |
| 1793 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 08/13/2009 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/599,570 | HUGHES ET AL. | |
| | Examiner | Art Unit | |
| | YOSHITOSHI TAKEUCHI | 1793 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *06 July 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1 and 3-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 October 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

1. Claims 1 and 3-14 are presented for examination. Claims 2 and 15 are cancelled.

### *Continued Examination Under 37 CFR 1.114*

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 6, 2009 has been entered.

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1 and 3-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to the limitation “but so that a jet or stream of the injected gas is unable to pass through the lower surface of the slag phase and the gas is substantially precluded from contacting the continuous copper phase", the examiner notes that “unable to pass through the lower surface of the slag phase" would not allow for contact with the copper phase. However, "substantially precluded from contacting the continuous copper phase” would allow for contact with the copper phase and thus it is unclear whether the scope of the claim includes injected gas that contacts the copper phase or injected gas that does not contact the copper phase.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claim 1, 3–7 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edwards et al (US 5,888,270).

a. Regarding claim **1** and **5** – **7**, Edwards teaches a process with the steps of: adding the copper sulfide matte and flux to an agitated slag phase (abstract); and injecting, from a discharge tip at the lower end of a top-submerged tubular lance (abstract and Figure 2), an oxidizing gas suitable for reacting with the matte to produce blister copper which forms or adds to a continuous blister copper phase below the iron-based silicate slag phase (abstract); wherein the depth of the iron based silicate slag phase and the level at which the lance tip is located in the slag phase are such that the injected gas agitates the slag phase (abstract, implied that the lance is located to agitate the slag phase, since the gasses perform the agitation and the gases are introduced by the lance) and reacts with copper sulfide matte dispersed in the slag phase (abstract) , positioning the lance tip such that a jet or stream of the injected gas is unable to pass through the lower surface of the slag phase and; injection is at a mid-region of the height of the slag; or the injection is near the upper surface of the slag.

Edwards does not teach the gas is substantially precluded from contacting the continuous copper phase. However, in view of the indefiniteness of claim 1 as set forth above and the fact that Edwards teaches that a "substantial portion of the gas contacts the blister copper from the continuous slag phase. (2:4142). The instantly claimed term "substantial" is ambiguous and is interpreted by the examiner to overlap the disclosure provided by Edwards.

b. Regarding claims **3** and **4** Edwards teaches the process of claim 1, but does not explicitly teach the slag phase having a depth of from about 700 mm to about 1.7 m.

However, because the processes and treated compositions are similar, in absence of proof to the contrary, it would be expected that the compositions taught by Edwards in view of Meissner would have similar slag phase having a depth of from about 700 mm to about 1.7 m as claimed. MPEP § 2112.01(I).

c. Regarding claims **13** and **14**, Edwards teaches the use of carbon in the form of coal for the purpose of being used as a fuel (column 3, lines 3-4, as a fuel, the coal would be a reductant), but does not teach the coal in the form of lump coal. However, coal is commonly found in the form of lump coal, it would have been obvious to one of ordinary skill in the art at the time of the invention to use lumps of coal to introduce carbon as a reductant into the melt.

9. Claims 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edwards et al (US 5,888,270) as applied to claim 1 *supra*, and in view of Poijarvi (WO 01/49890).

a. Regarding claims **8**–**10**, Edwards teaches the process of claim 1 as discussed *supra*, modified with lime (column 5, line 33), but does not teach a iron-based silicate slag or ferrous calcium silicate olivine slag.

Poijarvi teaches a method for the production of blister copper (title), using fayalite (page 7, line 15), where fayalite is an iron-based silicate and is a type of olivine mineral. Poijarvi further teaches that "[i]ron silicate slag…can be used in a blister furnace depending on the composition of the concentrate…. If slag concentration is part of the slag processing then it is advantageous that the slag is iron silicate slag." (Page 3, lines 21-26).

As a result, it would have been obvious to a person of ordinary skill at the time of the invention to use the fayalite of Poijarvi in the process of Edwards, since Poijarvi teaches that it is advantageous to use an iron silicate slag if both matte and blister production take place in the same smelter, as is the case in the Edwards.

b. Regarding claims **11** and **12**, Edwards in view of Poijarvi teaches the process of claim 8 (see *supra*), modified with lime (column 5, line 33), where the ratio of CaO : Fe is within the claimed range (response to Office action page 65), but does not teach the ratios of Fe : $SiO_2$ or CaO : $SiO_2$ within the claimed range. However, Poijarvi teaches the concentration of Fe to $SiO_2$ in the fayalite slag to be: 28.7% Fe and 21% $SiO_2$, such that the Fe : $SiO_2$ ration is 1.367, well within the claimed range of 1.14 to 1.55. As a result, it would have been obvious to a person of ordinary skill at the time of the invention to use the fayalite with a Fe : $SiO_2$ ratio of 1.367 in the process of Edwards since fayalite is useful as a source of iron and silicate in the slag.

c. While Edwards teaches the use of CaO, it teaches the *preferred* ratio of CaO : $SiO_2$ to be of the *order* from 5 to 10 (column 3, lines 12-14), not the claimed CaO : $SiO_2$ ratio of 0.22 to 1.11. It was well known in the industry at the time of the invention that the SiO2 in the sand reacts with the CaO, and iron oxide to form slag, $FeSiO_3$ and $CaSiO_3$. As a result, the ratio of the SiO2 and CaO is a result-effective variable in terms of the flux of the slag.

Therefore, it would have been obvious to a person of ordinary skill at the time of the invention to adjust the ratio of CaO : $SiO_2$ to obtain the optimal mixture of components in the slag layer. Furthermore, "where the general conditions of a claim are

disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454 (CCPA 1955). It would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the ratio of CaO : $SiO_2$ used in the Edwards process to optimize the components of the slag layer. See also MPEP § 2144.05(II).

***Response to Declaration***

10. Applicant's declaration filed July 6, 2009 has been fully considered but it is not persuasive for the reasons provided in the Response to Arguments section.

***Response to Arguments***

11. Applicant's arguments filed July 6, 2009 have been fully considered but they are not persuasive. The applicant makes the following arguments:

a. First, the applicant argues the instantly claimed "iron-based silicate slag" and the slag of Edwards are "chemically distinct" (Response to Office action p.5), where the argument is supported by a declaration.

In response, the starting materials of both the instantly claimed invention and the Edwards reference use the same starting materials (e.g. coal and lime) in similar processes. The instant claim is broadly written; and, the Edwards composition is a slag based on iron, and includes silicate, reading on the instant claim.

b. Second, the applicant argues the position of the lance tip of the Edwards reference does not read on the instantly claimed invention.

In response, the examiner notes that "substantially precluded from contacting the continuous copper phase" could allow for contact with the copper phase and is unclear as

to the degree of contact permissible. During patent prosecution, a claim limitation is to be given the broadest reasonable interpretation. See MPEP § 2111. As a result, the examiner give the claim limitation the broadest reasonable interpretation, and finds "substantially precluded" and "a substantial portion of the gas contacts the blister copper phase" may overlap in a manner similar to where a glass of water can be both substantially empty and substantially full. As a result, the Edwards reference satisfies the instant claim.

c. Third, the applicant argues Meissner does not disclose an adjustable lance, but only fixed tuyeres.

In response, Edwards suggests the lance is adjustable, in order to "ensure a substantial portion of the gas contacts the blister copper phase." (2:40-42)

d. Fourth, the applicant argues Edwards and Meissner "do not tech a slag phase having a depth of from about 700 mm to about 1.7 m." (Response to Office action, p.6. Emphasis in the original).

In response, because the processes and treated compositions are similar, in absence of proof to the contrary, it would be expected that the compositions taught by Edwards in view of Meissner would have similar slag phase having a depth of from about 700 mm to about 1.7 m as claimed. MPEP § 2112.01(I).

e. Fifth, the applicant uses the declaration to argue that the Poijarvi publication is not obvious to combine with Edwards in view of Meissner.

In response, this argument is moot in view of the new grounds of rejection *supra*.

d. Sixth, regarding paragraph 5(b) of the prior Office action, the applicant argues the "reasoning fails to explain what benefit there would be in the process of the Edwards

patent and the Fe : $SiO_2$ of fayalite slag of the Poijarvi publication" and also "there is no logical basis for linking the CaO : Fe ratio of the calcium ferrite slag of the Edwards patent and the Fe : $SiO_2$ of fayalite slag of the Poijarvi publication."

In response, Poijarvi encourages the use an iron silicate slag as "advantageous if both matte and blister production take place in the same smelter, as is the case in the Edwards. (P.3 lines 23-34).

***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Copper Smelting—Generalized, www.elmhurst.edu/~chm/vchembook/335coppersmelter.html (last visited February 2, 2009).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YOSHITOSHI TAKEUCHI whose telephone number is (571) 270-5828. The examiner can normally be reached on Monday-Thursday 9:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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